

12. Marketing and Regulatory Programs

■ Agricultural Marketing Service

When you visit the grocery store, you know you'll find an abundance and variety of top-quality produce, meats, and dairy products. If you're like most people, you probably don't give a second thought to the marketing system that brings that food from the farm to your table. Yet, this state-of-the-art marketing system makes it possible to pick and choose from a variety of products, available all year around, tailored to meet the demands of today's lifestyles. Millions of people—from grower to retailer—make this marketing system work. Buyers, traders, scientists, factory workers, transportation experts, wholesalers, distributors, retailers, advertising firms—in addition to the Nation's farmers—all help create a marketing system that is unsurpassed by any in the world. And USDA's Agricultural Marketing Service (AMS) helps make sure the U.S. marketing system remains world-class.

Services to Promote Quality: Grading, Quality Standards, and Certification

Wherever or whenever you shop, you expect good, uniform quality and reasonable prices for the food you purchase. AMS quality grade standards, grading, certification, inspection, and laboratory analysis are voluntary tools that industry can use to help promote and communicate quality and wholesomeness to consumers. Industry pays for these services and since they are voluntary, their widespread use by industry indicates they are valuable tools in helping market their products.

USDA quality grade marks are usually seen on beef, lamb, chicken, turkey, butter, and eggs. For many other products, such as fresh and processed fruits and vegetables, the grade mark isn't always visible on the retail product. In these commodities, the grading service is used by wholesalers, and the final retail packaging may not include the grade mark. However, quality grades are widely used—even if they are not prominently displayed—as a “language” among traders. They make business transactions easier whether they are local or made over long distances. Consumers, as well as those involved in the marketing of agricultural products, benefit from the greater efficiency permitted by the availability and application of grade standards.

Grading is based on standards, and standards are based on measurable attributes that describe the value and utility of the product. Beef quality standards, for instance, are based on attributes such as marbling (the amount of fat interspersed with lean meat), color, firmness, texture, and age of the animal, for each grade. In turn, these factors are a good indication of tenderness, juiciness, and flavor of the meat—all characteristics important to consumers. Prime, Choice, and Select are all grades familiar to consumers of beef.

Standards for each product describe the entire range of quality for a product, and the number of grades varies by commodity. There are eight grades for beef, and three each for chickens, eggs, and turkeys. On the other hand, there are 45 grades for cotton, 26 grade standards or specifications for dairy products, and more than 312 fruit, vegetable, and specialty product standards.

■ **Facts about grading:**

From October 1997 through September 1998, USDA graded 30 percent of the shell eggs and 95 percent of the butter produced in the United States. Nearly 83 billion pounds of fresh fruits and vegetables and more than 11 billion pounds of processed fruits and vegetables received a USDA grade mark. Nearly all of the meat industry requests AMS grading services: USDA grades were applied to 83 percent of all beef, 91 percent of all lambs, 23 percent of all veal and calves, 69 percent of all turkeys, and 41 percent of all chickens and other poultry marketed in this country. USDA also graded more than 98 percent of the cotton and 97 percent of the tobacco produced in the United States. In addition 88 percent of the butter sold in consumer size packages is marketed bearing the USDA grade shield.

The food testing side of the AMS program has nine user-funded laboratories performing numerous microbiological, chemical, and physical analyses on a host of food and fiber commodities, including processed dairy products, meat, poultry, egg products, and fruits and vegetables. This testing supports AMS purchases for the National School Lunch Program and other domestic feeding programs, troop ration specifications for the Department of Defense, export of U.S. food to foreign countries, laboratory quality control and assurance programs, and testing for aflatoxin in peanut products.

In addition to grading and laboratory services, USDA provides certification services, for a fee, that facilitate ordering and purchase of products used by large-volume buyers. Certification assures buyers that the products they purchase will meet the terms of their contracts—with respect to quality, processing, size, packaging, and delivery. If a large buyer—such as a school district, hospital, or prison—orders huge volumes of a particular product such as catsup or processed turkey or chicken, it wants to be sure that the delivered product meets certain needs. Too much money is involved to risk getting tomato soup when you need catsup, and meals can't be postponed while the mistake gets corrected. Graders review and accept agricultural products to make sure they meet contract requirements and specifications set by private-sector purchasers. They also certify food items purchased for Federal feeding programs.

AMS has developed quality assurance (QA) services that include Hazard Analysis and Critical Control Point (HACCP) and International Organization for Standardization (IOS)-based programs. These programs ensure and document that companies' operations are in compliance with provisions of contracts and/or their own standards and procedures. QA services are voluntary, hourly fee-based, and

value-added. HACCP concepts and procedures have been recommended by the National Academy of Sciences for application in the food industry, and IOS procedures are becoming an international norm for some processes. Another Quality Assurance activity performed by AMS is the accreditation or certification of laboratories whose customers need the testing service of these laboratories to facilitate the export of U.S. products. In addition, AMS' laboratories are currently pursuing accreditation under IOS/IEC Guide 25, an internationally recognized guide for quality systems in laboratory operations.

AMS' Dairy programs conducts comprehensive evaluations of dairy and related products manufacturing plant facilities and equipment to assure their eligibility to receive grading service and display the grade shield on products. Associated with this service is a sanitary design evaluation service for processing equipment. Under this service, processors can have the sanitary aspects of the design and the cleanability of a machine or process evaluated prior to installation in their facility. A similar service is being developed by AMS for the meat and poultry industry.

Spreading the News

Farmers, shippers, wholesalers, and retailers across the country rely on AMS Market News for up-to-the-minute information on commodity prices and shipments. Market News helps industry make the daily critical decisions about where and when to sell, and what price to expect. Because this information is made so widely available, farmers and those who market agricultural products are better able to compete, ensuring consumers a stable and reasonably priced food supply.

AMS Market News reporters generate approximately 700 reports each day, collected from more than 100 U.S. locations. Reports cover local, regional, national, and international markets for dairy, livestock, meat, poultry, grain, fruit, vegetables, tobacco, cotton, and specialty products. Weekly, biweekly, monthly, and annual reports track the longer range performance of cotton, dairy products, poultry and eggs, fruits, vegetables, specialty crops, livestock, meat, grain, floral products, feeds, wool, and tobacco. Periodically, AMS issues special reports on such commodities as olive oil, pecans, peanuts, and honey.

USDA's commodity market information in Market News is easily accessible—via newspapers, television, and radio; printed reports mailed or faxed directly to the user; telephone recorders; electronic access through the Market News Communication System and the Internet; through electronic mail; and by direct contact with USDA reporters.

Buying Food: Helping Farmers, School Children, and Needy Persons

AMS serves both farmers and those in need of nutrition assistance through its commodity procurement programs. By purchasing wholesome, high-quality food products that are in abundance, AMS helps provide stable markets for producers. The Nation's food assistance programs benefit from these purchases, because these foods go to low-income individuals who might otherwise be unable to afford them.

Some of the programs and groups that typically receive USDA-purchased food include: children in the National School Lunch, Summer Food Service, and School

Breakfast Programs; Native Americans participating in the Food Distribution Program on Indian Reservations; older Americans through the Nutrition Program for the Elderly; and low-income and homeless persons through the Commodity Supplemental Food Program and the Emergency Food Assistance Program. In addition, USDA helps provide disaster relief by making emergency purchases of commodities for distribution to disaster victims.

Once USDA determines that a purchase is appropriate, AMS publicly invites bids, and makes sure that the food it purchases meets quality and nutrition standards. Often, AMS specifies that foods be low in fat, sugar, and sodium. Compliance with these requirements is ensured through testing in AMS laboratories. AMS only purchases products that are 100 percent domestic in origin.

Pesticides: Information and Records

The U.S. food supply is one of the safest in the world, but the public is still concerned about the effects of agricultural pesticides on human health and environmental quality. The Pesticide Data Program (PDP), which is administered by AMS, provides statistically reliable information on chemical residues found on agricultural commodities such as fresh and processed fruits and vegetables, grain, and milk. PDP is a Federal-State partnership where 10 participating States using uniform procedures collect and test these commodities. The information gained helps form the basis for conducting realistic dietary risk assessments and evaluating pesticide tolerances as required by the Food Quality Protection Act of 1996. The Environmental Protection Agency uses PDP data to address re-registration of pesticides. Other Federal agencies use the data to respond more quickly and effectively to food safety issues. PDP's data are also used to support the export of American commodities in the competitive global marketplace and to assess with integrated pest management activities.

AMS also administers the Federal Pesticide Recordkeeping Program, which requires certified private applicators to keep records of their restricted use pesticide applications for a period of 2 years. These records support collection of pesticide use data to help analyze agricultural pesticide use and are used by health care professionals when treating individuals who may have been exposed to a restricted use pesticide. AMS works with State pesticide regulatory agencies and Cooperative Extension Services to provide the regulatory and education aspects of the program.

Helping Farmers Promote Their Products

"The Touch...the Feel of Cotton...the Fabric of Our Lives," "Beef...It's What You Want," "Got Milk?." If you've watched television or read magazines lately, you've probably heard or read these slogans and others for a host of agricultural commodities. All of these promotional campaigns are part of the Research and Promotion Programs that AMS oversees.

Federal research and promotion programs, authorized by Federal legislation, are designed to strengthen the industry's position in the marketplace and to maintain and expand domestic and foreign markets. The programs are all fully funded by industry assessments. Board members are nominated by industry and appointed officially by the Secretary of Agriculture. AMS oversees the activities of the boards or councils and approves budgets, in order to assure compliance with the legislation.

Currently, there are research and promotion programs for beef, pork, cotton, fluid milk and dairy products, eggs, honey, mushrooms, potatoes, soybeans, watermelons, and popcorn.

But, while advertising is one part of these programs, product research and development is also a major focus. Wrinkle-resistant cotton and low-fat dairy products are just two examples of how these programs have benefitted consumers and expanded markets for producers.

New generic commodity promotion, research, and information legislation was enacted as part of the 1996 Farm Bill to make Federal promotion and research programs available to more commodities.

Marketing Orders: Solving Producers' Marketing Problems

Marketing agreements and orders help dairy, fruit, vegetable, and peanut producers come together to work at solving marketing problems they cannot solve individually. Marketing orders are flexible tools that can be tailored to the needs of local market conditions for producing and selling. They have the force of law, and are subject to USDA oversight.

Federal milk marketing orders, for example, establish minimum prices that milk handlers or dealers must pay to producers for milk, depending on how that milk is used—whether fluid milk, ice cream, cheese, or other storable product. Federal milk orders help build more stable marketing conditions by operating at the first level of trade, where milk leaves the farm and enters the marketing system. They assure that consumers will have a steady supply of fresh milk at all times.

Marketing agreements and orders also help provide stable markets for fruit, vegetable, and specialty crops like nuts and raisins, to the benefit of producers and consumers. They help farmers produce for a market, rather than having to market whatever happens to be produced. A marketing order may help an industry smooth the flow of crops moving to market, to alleviate seasonal shortages and gluts. In addition, marketing orders help maintain the quality of produce being marketed; standardize packages or containers; and authorize advertising, research, and market development. Each program is tailored to the individual industry's marketing needs.

Ensuring Fair Trade in the Market

AMS also administers several programs that ensure fair trade practices among buyers and sellers of agricultural products.

Fruit and Vegetable Programs, PACA Branch, administers the Perishable Agricultural Commodities Act (PACA), which promotes fair trading in the fresh and frozen fruit and vegetable industry. PACA extends to produce dealers, commission merchants, and brokers who operate subject to PACA and requires that these entities be licensed.

PACA provides for administrative disciplinary proceedings to be brought against licensees or unlicensed entities subject to PACA that commit unfair trade practices such as bribery, failing to account and make full payment promptly for purchases, misbranding, or making false or misleading statements for a fraudulent purpose. A finding of the commission of these violations could lead to a license revocation or suspension, or the imposition of a civil penalty. Under the PACA, partners in a part-

nership or major corporate officers, directors, and shareholders of a corporation whose PACA license has been suspended or revoked may be determined by the agency to be responsibly connected with the partnership or corporation. A determination of responsible connection will bar the person or firm from licensing and employment by any licensee or entity subject to license for a period of time. The person or firm determined to be responsibly connected has the right to a hearing to appeal that determination. PACA also provides administrative reparation proceedings by which the parties can resolve contract disputes resulting from the buying and selling of produce. Further, PACA provides statutory trust protection for unpaid produce suppliers, whose trust claims have priority over the claims of secured lenders if the debtor files for bankruptcy.

The fruit and vegetable industry needs the protections provided by PACA because of the highly perishable nature of the products involved. Trading in produce is considerably different than trading for a car, a computer, or even grain. When a vegetable grower does not get paid, the product usually cannot be reclaimed before it spoils—or before it has already been consumed. Further, the parties are often located across the country from each other, and the seller has no control over the produce once the produce leaves the seller's possession.

Although PACA was initiated to protect producers, it benefits consumers and the entire produce industry. Over the past decade, AMS has handled nearly 40,000 PACA complaints, not just from growers, but also from grower-agents, grower-shippers, brokers, wholesalers, retailers, and processors. PACA is funded by license fees paid by industry, but the bottom line is that fair trade and resolved disputes mean businesses of any size can operate in a better trade environment and consumers can get a wider choice of reasonably priced, high-quality fruits and vegetables.

The Federal Seed Act (FSA) protects everyone who buys seed by prohibiting false labeling and advertising of seed in interstate commerce. The FSA also complements State seed laws by prohibiting the shipment of seed containing excessive noxious weed seeds. Labels for agricultural seed must state such information as the kinds and percentage of seed in the container, percentages of foreign matter and weed seeds, germination percentage and the date tested, and the name and address of the shipper. USDA also tests seed for seed sellers and seed buyers on a fee-for-service basis to determine quality.

The Plant Variety Protection Act provides patent-like protection to breeders of plants that reproduce both sexually, that is, through seeds, and through tubers. Developers of new plant varieties can apply for certificates of protection. This protection enables the breeder to market the variety exclusively for 20 years and, in so doing, creates an incentive for investment in the development of new plant varieties. Since 1970, AMS' Plant Variety Protection Office has issued more than 4,000 certificates of protection.

The Agricultural Fair Practices Act allows farmers to file complaints with USDA or a U.S. District Court if a processor refuses to deal with them because they are members of a producers' bargaining or marketing association. The act makes it unlawful for handles to coerce, intimidate, or discriminate against producers because

they belong to such groups. USDA, with the cooperation of the Department of Justice, acts to preserve farmers' rights under this act.

Organic Certification

AMS is responsible for developing and implementing an organic certification program, which was authorized by the Organic Foods Production Act as part of the 1990 Farm Bill. Current estimates of organic retail sales total over \$3.5 billion, and there are an estimated 12,000-15,000 farmers who describe their operations as organic.

The goals of the organic certification program are to:

- Establish national standards governing the marketing of certain products as organically produced,
- Assure consumers that organically grown products meet consistent standards, and
- Facilitate interstate commerce in fresh and processed food that is organically produced.

Under the act, a National Organic Standards Board was appointed in January 1992. Its job is to help develop standards for substances to be used in organic production.

In December 1997, USDA issued a proposed rule with a comment period that closed at the end of April 1998. USDA received 275,603 comments on the proposal. A revised proposal will be published in 2000 for further comment.

Direct Marketing and Wholesale Market Development

AMS continually seeks ways to help farmers and marketers improve the U.S. food marketing system. For example, AMS' Federal-State Marketing Improvement Program (FSMIP) provides matching funds to State Departments of Agriculture or other State agencies for marketing research or marketing service projects to improve marketing systems. The aim of the program is to reduce costs or identify new market opportunities for producers, ultimately benefiting consumers through lower food costs and more food choices. Projects include research on innovative marketing techniques, taking those research findings into the marketplace to "test market" the results, and developing State expertise in providing service to marketers of agricultural products. In FY 1998, the FSMIP program funded 24 projects in 18 States for \$1.2 million.

The Wholesale and Alternative Markets Program works to improve the handling, processing, packaging, storage, and distribution of agricultural products. AMS researchers work with local governments and food industry groups to develop modern, efficient, wholesale food distribution centers and farmers markets. AMS also conducts research and outreach on alternative marketing channels for goods produced by small and limited-resource farmers and processors. Agricultural producers, producer groups, shippers, exporters, rural communities, carriers, and consumers all benefit from the analyses, technical assistance, and information.

■ **Fact about farmers markets:**

USDA defines a farmers market as a group of farmers and vendors leasing or renting space in a common facility on a temporary basis, with an emphasis on the sale of fresh farm products, crafts, and other locally produced items. USDA estimates there are currently more than 2,700 farmers markets in the United States.

Efficient Transportation for Agriculture

An efficient transportation system allows consumers access to a wide variety of agricultural products and commodities produced beyond their own localities.

AMS, through its Transportation and Marketing Programs, conducts research on the logistical requirements and constraints involved in transporting and distributing U.S. agricultural products to destination markets by railroads, trucks, inland barges, and ocean vessels, and monitors the adequacy of existing infrastructure to support efficient commerce. The research reports and technical assistance provided by AMS transportation and marketing specialists are designed to help agricultural growers, processors, shippers, and exporters respond more effectively to emerging changes in both the domestic and international marketplace and are specifically targeted at the smaller grower, processor, shipper, or exporter who may lack easy access to relevant market research.

Produce Locally, Think Globally

To remain competitive in today's world, American agriculture has become more global, and AMS has striven to be a strong partner in expanding markets for U.S. agricultural products.

The AMS role in the international marketing of U.S. commodities centers on its quality grading and certification programs, which are user-fee funded. Grading involves determining whether a product meets a set of quality standards. Certification ensures that contract specifications have been met—in other words, that the buyer receives the product in the condition and quantity described by the terms of the contract. AMS commodity graders frequently support other USDA agencies involved in export assistance, including the Farm Service Agency and the Foreign Agricultural Service.

U.S. companies often request certification services when exporting to a country that has specific import requirements. Certification services provided by AMS help avoid rejection of shipments or delay in delivery once the product reaches its foreign destination. Delays lead to product deterioration and, ultimately, affect the image of U.S. product quality. AMS' Quality Systems Verification Program provides independent, third-party verification of a supplier's documented quality management system. The program was developed to promote world-class quality and to improve the international competitiveness of U.S. livestock and meat.

AMS also provides laboratory testing for exporters of domestic food commodities in keeping with sanitary and phytosanitary requirements of foreign countries. To date, this service has been requested by exporters of products destined for Japan, South Korea, and other Pacific Rim countries, South Africa, European Union member countries, and countries of the former Soviet Union.

For selected fruits, vegetables, nuts (including peanuts), and specialty crops imported into the United States, minimum quality requirements must be met. For the most part, however, firms importing agricultural products into the United States use grading services voluntarily. AMS graders are often asked to demonstrate commodity quality standards and grading procedures to foreign firms and governments.

In addition to grading and certification services, AMS market news offices provide information on sales and prices of both imports and exports. Today, U.S. market participants can receive market information on livestock and meat from Venezuela, New Zealand, Japan, Poland, and other Pacific Rim markets, Mexico, Canada, Australia, and New Zealand; fruits and vegetables from France, Great Britain, Bulgaria, Poland, Mexico, New Zealand, and Canada; ornamentals from Germany, France, and Mexico; dairy products from Eastern and Western Europe and Oceania; and a host of products from Ukraine, Kazakhstan, and Russia.

AMS participates in a number of international forums that aim to facilitate world agricultural trade and avoid potential trade barriers. Technical assistance has been provided to countries in Eastern and Central Europe, and elsewhere around the globe, to improve their marketing systems. With improved transportation, distribution, and marketing information systems, these countries will become better customers for U.S. food and fiber products.

Whether at home or abroad, AMS strives to help U.S. agriculture market its abundant, high-quality products. And AMS will continue to work to help U.S. agriculture market its products in growing world markets, while assuring U.S. consumers an abundant supply of high-quality, wholesome food at reasonable prices.

■ Animal and Plant Health Inspection Service: Protecting Agricultural Health and Productivity

Why are the farmers and ranchers of the United States able to produce so much food for the tables of America's consumers?

Of course, there's no simple answer. But one key to this plentiful supply of food can be summed up in a single phrase: "Healthy crops and livestock."

And this is no accident. America's agricultural health is a result of a team effort—good husbandry by farmers and ranchers plus an organized effort to control and eradicate pests and diseases and to prevent the entry of devastating foreign plagues.

Just like frosts, floods, and droughts, pests and diseases can wreak havoc on agricultural productivity, depressing farm incomes and driving up food costs for consumers in the process. While we may not be able to prevent weather-related disasters,

USDA plays a vital role in protecting our country's agricultural health. The result is a more abundant, higher quality, and cheaper food supply than is found anywhere else in the world.

If agriculture is this foundation of manufacture and commerce, there is perhaps no greater mission than making sure that foundation remains healthy and strong. With the advent of free trade initiatives, a global network of countries has agreed that valid agricultural health concerns—not politics, not economics—are the only acceptable basis for trade restrictions. In this environment, our country's agricultural health infrastructure will be our farmers' greatest ally in seeking new export markets.

Excluding Foreign Pests and Diseases

Agricultural Quarantine Inspection

Agriculture, America's biggest industry and its largest employer, is under constant threat of attack. The enemies are countless and often microscopic, and they gain access to our country in surprising ways. Their potential allies are every traveler entering the United States and every American business importing agricultural products from other countries.

Many passengers entering the United States don't realize that one piece of fruit packed in a suitcase has the potential to cause millions of dollars in damage to U.S. agriculture. Forbidden fruits and vegetables can carry a whole range of plant diseases and pests. Oranges, for example, can introduce diseases like citrus canker or pests like the Mediterranean fruit fly (Medfly).

Similarly, sausages and other meat products from many countries can contain animal disease organisms that can live for many months and even survive processing. Meat scraps from abroad could end up in garbage that is fed to swine. If the meat came from animals infected with a disease, such as African swine fever, classical swine fever, or foot-and-mouth disease (FMD), it could easily be passed to domestic swine, and a serious epidemic could result. An outbreak of African swine fever in U.S. hogs would drive up the price of pork to consumers, cost hundreds of millions of dollars to eradicate, and close many U.S. export markets.

USDA's Animal and Plant Health Inspection Service (APHIS) safeguards U.S. borders against the entry of foreign agricultural pests and diseases. At all airport terminals, seaports, and border stations, about 1,600 Plant Protection and Quarantine (PPQ) employees inspect international conveyances and the baggage of passengers for plant and animal products that could harbor pests or disease organisms. At international airports, detector dogs in APHIS' Beagle Brigade help find prohibited agricultural materials. PPQ officers also inspect ship and air cargoes, rail and truck freight, and package mail from foreign countries. At animal import centers, APHIS veterinarians check animals in quarantine to make sure they are not infected with any foreign pests or diseases before being allowed into the country.

The following table provides selected inspection and interception data:

<i>FY</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>
Ships Inspected	53,270	52,661	52,974	52,348	50,778
Aircraft Inspected	451,342	401,741	410,318	461,927	422,735
Passengers and Crew Inspected	62,548,979	65,645,734	66,119,960	68,448,289	72,191,992
Interceptions of Plant Material	1,442,214	1,583,687	1,567,886	1,609,370	1,480,773
Interceptions of Pests	54,831	58,032	48,483	62,830	52,761
Interceptions of Meat/Poultry Products	281,230	223,392	264,001	294,674	331,616
Baggage Civil Penalties-Number	22,164	21,813	20,716	21,498	19,302
Baggage Civil Penalties-Amount of Fines	\$1,186,310	\$1,098,220	\$1,080,000	\$1,107,670	\$1,004,725

From high-tech to a keen nose, APHIS uses a variety of means to safeguard American agriculture. PPQ officers augment visual inspection with some 130 x-ray units that help check passenger baggage and mail for prohibited agricultural materials. They also have enlisted trained detector dogs and their keen sense of smell to help sniff out prohibited fruit and meat. On leashes and under the constant supervision of their handlers, the friendly beagles in USDA's Beagle Brigade have checked the baggage of passengers arriving from overseas for 15 years. Currently, APHIS has about 48 canine teams at 21 airports, including 19 of America's 20 busiest international airports.

Preclearance—Checking at the Source

In addition to domestic exclusion efforts, APHIS has a corps of experts stationed overseas, sometimes with the help of APHIS officers on temporary duty, that bolsters the Nation's defenses against exotic pests and diseases. Often it is more practical and effective to check and monitor commodities for pests or diseases at the source through preclearance programs. APHIS has special arrangements with a number of countries for preclearance programs, which are summarized in the table.

International Programs

Through direct overseas contacts, International Services (IS) employees gather and exchange information on plant and animal health; work to strengthen national, regional, and international agricultural health organizations; and cooperate in international programs against certain pests and diseases that directly threaten American agriculture. Two of the latter are the MOSCAMED program—which combats Medfly infestations in Mexico and Guatemala—and a program to eradicate screwworms, a parasitic insect of warm-blooded animals. Screwworm flies lay their eggs on the edge of open wounds, and the developing larvae feed on the living flesh of the host. Left untreated, the infestation can be fatal.

<i>Country</i>	<i>Commodities</i>
Argentina	Apples & pears
Belgium	Flower bulbs
Brazil	Mangoes
Chile	Stonefruit, berries, grapes, cut flowers, cherimoya, kiwifruit, other fruits & vegetables
Costa Rica	Mangoes
Ecuador	Mangoes & melons (free zone)
Great Britain	Flower bulbs
Guatemala	Mangoes
Haiti	Mangoes
Ireland	Flower bulbs
Israel	Flower bulbs
Jamaica	Ugli fruit, cut flowers, papaya & 46 other commodities
Japan	Sand pears, Unshu oranges, Fuji apples
Korea	Sand pears, mandarin oranges
Mexico	Mangoes, citrus (fumigation or from Sonora free zone), apples, apricots, peaches, persimmons, & pomegranates (Sonora free zone)
New Zealand	Apples, pears, Nashi pears
The Netherlands	Flower bulbs
Nicaragua	Mangoes
Peru	Mangoes
Scotland	Flower bulbs
South Africa	Apples, pears, plums, grapes, peaches, nectarines, & citrus
Spain	Lemons, clementines, Valencia oranges
Turkey	Flower bulbs
Venezuela	Mangoes

Screwworms were eradicated from the United States through the use of the sterile insect technique. With this method, millions of screwworm flies are reared in captivity, sterilized, and then released over infested areas to mate with native fertile flies. Eggs produced through such matings do not hatch, and the insect literally breeds itself out of existence.

To provide further protection to U.S. livestock, starting in 1972, eradication efforts were moved southward from the U.S.-Mexico border, with the eventual goal of establishing a barrier of sterile flies across the Isthmus of Panama. To date, screwworms have been eradicated from Mexico, Guatemala, Belize, Honduras, El Salvador, and Nicaragua. Eradication is well advanced in Costa Rica and as of June 1999, no new cases had been reported since March 18, 1999. Eradication in Panama began in 1998, and a new rearing facility is planned. Currently, the production plant at Tuxtla Gutierrez, Chiapas in Mexico is producing 143 million sterile flies weekly. The plant has the capacity to produce 500 million sterile flies weekly.

IS also works to prevent foot-and-mouth disease (FMD) from entering Mexico, Central America, and Panama and works with Colombia to eliminate FMD from the northern part of that country.

Coping with Invasions

If, despite our best efforts, foreign pests or diseases do manage to slip past our border defenses, APHIS conducts appropriate control and eradication measures. Examples include Mediterranean fruit fly eradication projects in California in the early 1990's and outbreaks of exotic Newcastle disease in pet birds in several States during the 1980's.

APHIS PPQ has a special cadre of people who deal with introductions of exotic plant pests. Known as "Rapid Response Teams," these groups have been mobilized on several occasions to combat costly infestations of Medflies and to perform other tasks.

Early detection of exotic animal diseases by alert livestock producers and practicing veterinarians who contact specially trained State and Federal veterinarians is the key to their quick detection and elimination. More than 300 such trained veterinarians are located throughout the United States to investigate suspected foreign diseases. Within 24 hours of diagnosis, one of two specially trained task forces in APHIS' Veterinary Services (VS) can be mobilized at the site of an outbreak to implement the measures necessary to eradicate the disease.

Currently, APHIS officials are actively working to prevent the entry of bovine spongiform encephalopathy (BSE)—sometimes referred to as "mad cow disease." This disease has had a serious impact on the British livestock industry. BSE has never been diagnosed in the United States. Since 1989, APHIS has restricted the importation of live ruminants and ruminant products—including animal feed made with ruminant protein—from Great Britain and other countries where BSE is known to exist. In addition, APHIS has conducted a BSE surveillance program since 1989. Specialists have examined brain specimens from more than 7,052 cattle and have found no evidence of BSE.

Import-Export Regulations

APHIS is responsible for enforcing regulations governing the import and export of plants and animals and certain agricultural products.

Import requirements depend on both the product and the country of origin. Plants and plant materials usually must be accompanied by a phytosanitary certificate issued by an official of the exporting country. Livestock and poultry must be accompanied by a health certificate, also issued by an official of the exporting country. Animal products, such as meats and hides, are usually restricted if they originate in countries that have a disease that is not present in the United States.

APHIS regulates the importation of animals that enter the country through land ports along the borders with Mexico and Canada. Imports of livestock and poultry from most countries must be quarantined at one of three animal import centers: Newburgh, NY; Miami, FL; and Los Angeles, CA.

Personally owned pet birds can enter through one of five USDA-operated bird quarantine facilities: New York, NY; Miami, FL.; San Ysidro, CA.; Hidalgo, TX; and Los Angeles, CA. Those that qualify as U.S.-origin birds may return through any port of entry when arrangements have been made for a USDA-VS veterinarian to inspect their bird.

Pet birds from Canada can enter without quarantine because Canada's animal disease programs and import rules are similar to those of the United States. Commercial shipments of pet birds can enter through one of the privately owned, APHIS-supervised quarantine facilities. APHIS cooperates with the U.S. Department of Interior in carrying out provisions of the Endangered Species Act that deal with imports and exports of endangered plant, animal, or bird species. APHIS inspectors at ports of entry are trained to identify these species and notify Interior of any Convention on International Trade in Endangered Species (CITES)-protected species found during inspection. Also, at many ports, APHIS officers inspect and sample seed imported from foreign countries to ensure that it is accurately labeled and free of noxious weeds.

APHIS also maintains 16 plant inspection stations, the largest of which is at Miami, FL, for commercial importation of plant materials. Smaller stations are at Orlando, FL; San Juan, PR; JFK International Airport, Jamaica, NY; Elizabeth, NJ; Houston, El Paso, and Los Indios (Brownsville), TX; Nogales, AZ.; San Diego, Los Angeles, and San Francisco, CA; Seattle, WA; Honolulu, HI; Beltsville, MD; and New Orleans, LA.

To facilitate agricultural exports, APHIS officials certify the health of both plants and animals that are shipped to foreign countries. APHIS PPQ provides assurance that U.S. plants and plant products meet the plant quarantine import requirements of foreign countries. This assurance is in the form of a phytosanitary certificate, issued by PPQ or its State cooperators. During fiscal year (FY) 1997, 298,365 phytosanitary certificates were issued for exports of plants and plant products worth more than \$20 billion.

VS officials and the National Center for Import and Export negotiates animal health requirements for export of livestock, germplasm, poultry and animal products with the importing countries. These requirements are maintained in the International Regulations Retrieval System (IRRS). VS area offices and major exporters have access to the system. IRRS is also available on the World Wide Web.

USDA accredited veterinarians issue health certificates in order to meet the U.S. requirements and the requirements of the recipient country. These health certificates are endorsed by VS area veterinarians in the State of origin. The final inspection of livestock is conducted by a VS port veterinarian at the port of embarkment. This inspection is not required for livestock shipped to Canada and Mexico if they are shipped through land border ports.

It is in the area of foreign health requirements that APHIS is of greatest help to the U.S. livestock industry. Through direct negotiations with foreign governments, APHIS has established approximately 450 livestock, semen, embryo and poultry health agreements with more than 100 countries in the world. These negotiations are a continuous process, wherever APHIS finds opportunities to open new markets, and to reduce unnecessary impediments or whenever changing disease conditions require adjustments. In 1996, APHIS averted a ban of U.S. poultry meat to Russia and China worth more than \$2 billion.

In addition to certifying to the health of agricultural exports, APHIS officials mount a proactive approach to the marketing of U.S. crops and livestock overseas.

For instance, APHIS and Food Safety and Inspection Service officials coordinated negotiations to avert a Russian embargo on U.S. poultry exports worth \$600 million a year. On the plant side, efforts by APHIS and Foreign Agricultural Service officials helped maintain U.S. wheat exports after the March 1996 discovery of an outbreak of Karnal bunt, a fungal disease of wheat, in Arizona. The United States is the world's leading wheat exporter, accounting for 25 percent of world wheat exports in 1997. U.S. wheat exports in calendar 1997 were valued at \$3.4 billion.

■ Domestic Plant Health Programs

In most cases, plant pest problems are handled by individual farmers, ranchers, and other property owners and their State or local governments. However, when an insect, weed, or disease poses a particularly serious threat to a major crop, the Nation's forests, or other plant resources, APHIS may join in the control work.

Most pests and weeds that are targets of APHIS' Plant Protection and Quarantine (PPQ) programs are not native to America. They gained entry into this country through commercial trade channels, international travelers, or other means.

When pests are new to this country, control techniques may not be available. In any case, PPQ applies interstate quarantines and takes other steps to prevent spread until effective control measures can be developed.

In many cases, foreign pests are only minor problems in their native lands because they are kept in check by native parasites, predators, and diseases. Since many of these natural enemies may not exist in the United States, one of PPQ's control techniques—in cooperation with USDA's Agricultural Research Service—is the importation, rearing, and release of parasites and other biological control organisms.

Biocontrol—Nature's Way

In its classical sense, biological control means using predators, parasites, and pathogens to combat plant pests. Predators and parasites include insects, mites, and nematodes that naturally attack a target pest. Pathogens include bacteria, viruses, or fungi that cause diseases specifically injurious to a target pest.

Biological control was first put to broad, practical use in the United States in the 1880's. At that time, California citrus groves were being devastated by an exotic insect, the cottony-cushion scale. A USDA scout working in Australia found the vedalia beetle feeding on the scale insect. The beetle, part of the lady beetle family, was successfully introduced into California and other citrus-growing regions and has kept the scale insect from causing economic damage ever since.

To coordinate the important search for new and better biocontrol opportunities, a National Biological Control Institute was established in APHIS in 1989. The Institute's mission is to promote, facilitate, and provide leadership for biological control. Its main work is to compile and release technical information and coordinate the work needed to find, identify, and augment or distribute new biological control agents.

The Institute relies on scientists from USDA's Agricultural Research Service and elsewhere to identify potentially useful biological control agents. These agents are carefully screened at quarantine centers before being put to use.

Various agencies have successfully cooperated on biocontrol projects. For example, several decades ago, ARS scientists found six species of stingless wasps in Europe that keep alfalfa weevils in check. In 1980, APHIS took on the job of establishing these beneficial wasps across the land. Between 1980 and 1989, APHIS and its cooperators raised and distributed about 17 million wasps, and today there are beneficial wasps within reach of virtually every alfalfa field in the country. It's estimated that the benefits of the alfalfa weevil biocontrol program amount to about \$88 million per year, representing a return of about \$87 for each \$1 spent on the project.

Other APHIS biocontrol programs currently underway in cooperation with State agencies include efforts against the cereal leaf beetle, sweet potato whitefly, Colorado potato beetle, brown citrus aphid, pink hibiscus mealybug, gypsy moth, imported fire ant, leafy spurge, purple loosestrife, Russian knapweed, dalmatian and yellow toad-flax, diffuse and spotted knapweed. Promising biocontrol agents for other pests are being tested at PPQ biocontrol labs located at Mission, TX; Niles, MI; and Bozeman, MT.

“Deliver Us From Weevil”—Boll Weevil Eradication

One major domestic program PPQ is coordinating is the effort to eradicate boll weevils from the United States. The boll weevil entered this country from Mexico in the late 1890's and soon became a major pest of cotton. It has caused an estimated \$12 billion in losses to the Nation's economy. In 1973, it was estimated that insecticides applied to control boll weevils accounted for about one-third of the total applied to agricultural crops in the United States.

The success of a 1971-73 cooperative boll weevil eradication experiment in portions of Mississippi, Louisiana, and Alabama involving Federal and State agencies and grower associations led to two 3-year demonstration projects. One was an eradication trial in North Carolina and Virginia; the second was an optimum pest management trial in Mississippi. The eradication trial was a success in 1980, and the program has undergone regular, incremental expansion since that time.

The current boll weevil eradication effort judiciously applies pesticides based on the number of adult weevils trapped around cotton fields. The traps contain a pheromone (insect attractant) and a small amount of insecticide that kills all captured weevils. In eradication program areas, one to three traps are placed per acre and are checked weekly. Pesticide is applied only to fields that reach a predetermined number of trapped weevils. This selective use of pesticides results in fields requiring minimal pesticide applications—sometimes none—during the growing season. After several seasons, the weevils are eradicated within the defined program area, eliminating any further need to spray for this pest. As an indirect benefit of eliminating the boll weevil, growers are able to maintain beneficial insects that help control many secondary pests. This further reduces the amount of pesticide used each season to produce the cotton crop.

The table below shows the progress in eradicating boll weevils from U.S. cotton-growing areas.

	<i>States involved</i>	<i>Eradication Acres</i>	<i>Weevil-free Acres</i>
1983	VA/NC/SC	160,000	35,000
1985	+CA/AZ	1,400,000	1,100,000
1987	+GA/FL/AL	450,000	1,500,000
1994	+MS/TN/TX	50,000	2,000,000
1996	Same	1,300,000	4,600,000
1997	+LA	1,600,000	4,600,000
1998	+OK	2,000,000	*4,600,000

*significant acreage should move into “weevil-free” phase in 1999

In the cooperative boll weevil eradication program, APHIS provides technical support, a portion of program funds, and some capital equipment and administrative support. Grower assessments and/or State appropriations provided 87 percent of the total program cost in 1998, with APHIS providing the remaining 13 percent.

The economic benefit to cost ratio for the program has been projected to be 12 to1 nationwide, and as high as 40 to1 in specific areas of the Cotton Belt. The success of the program has brought a resurgence of cotton production and related industries. Acreage in the Southeast has increased nearly fourfold since the weevil’s eradication. Cotton growers in eradicated areas are better able to withstand difficult economic times, such as the low market prices of 1998, because their production costs—without the weevil—are much lower than those in the infested areas.

Witchweed—A Success Story

Witchweed is a parasitic plant that attaches itself to the roots of crops such as corn, sorghum, sugar cane, and other members of the grass family, robbing them of water and vital nutrients. Each plant can produce up to 500,000 seeds per year, and the seeds can remain viable in the soil for up to 15 years, germinating when they come into contact with the root of a host plant.

Witchweed was introduced into the Carolinas from Africa in the mid-1950’s. When the parasite first struck, corn plants mysteriously withered and died. A student visiting from India recognized the weed and told U.S. agricultural experts what it was.

Over the course of an eradication effort that began in 1974, some 450,000 acres have been infested. The eradication program was based on surveillance to locate infested fields, quarantines to prevent spread, and a combination of herbicides and germination stimulants to actually eradicate the weed.

At the beginning of FY 1995, with fewer than 28,000 infested acres remaining, APHIS turned operation of the program over to North Carolina to complete eradication there, but continues to help finish the eradication effort in South Carolina. By the fall of 1997, the infested area was expected to be reduced to 9,000 acres in North Carolina and 1,500 acres in South Carolina.

Grasshoppers and IPM

APHIS was the lead agency in a cooperative Integrated Pest Management (IPM) initiative for grasshopper control in the Western United States. This IPM project, which began in 1987 and closed down in 1994, was aimed at finding better and more acceptable ways of preventing grasshopper damage, while protecting the environment. Activities included developing means to predict and manage grasshopper outbreaks, developing biological control alternatives that minimize the use of chemicals, and integrating proven control techniques into guidelines for APHIS rangeland grasshopper programs.

All this information was integrated into a computer-based decision support system program called "HOPPER." HOPPER is a user-friendly software package that facilitates grasshopper predictions, time and selection of control options, compilation of weather data, and analysis of the economics of range management practices. An example of how HOPPER is used was provided by a Logan County, CO, official in August 1996. He wrote: "I was recently asked to utilize the district's resources to help ranchers save grass pasture obviously threatened by grasshoppers." Using the HOPPER computer model (previously downloaded from the Internet), he estimated the return and decided on the best treatment method.

"We discovered that we would spend \$4 per acre in an effort to save \$1.50 per acre of grass. The ranchers quickly realized they could purchase hay to replace lost forage and save money. The program showed us we would also have very little effect on next year's population. It also showed us that we should initiate any control effort sooner in the year than we have done in the past."

Other domestic PPQ programs include a quarantine program to prevent the artificial spread of the European gypsy moth from infested areas in the Northeastern United States through movement of outdoor household goods and other articles; quarantines to prevent the spread of imported fire ants through movement of plant nursery material from infested areas; and releasing irradiated sterile pink bollworm moths to keep this insect out of cotton in California's San Joaquin Valley.

Domestic Animal Health Programs

Protecting the health of the Nation's livestock and poultry industries is the responsibility of APHIS' Veterinary Services (VS).

VS veterinary medical officers and animal health technicians work with their counterparts in the States and with livestock producers to carry out cooperative programs to control and eradicate certain animal diseases. The decision to begin a nationwide campaign against a domestic animal disease is based on a number of factors, the most important of which is: "Are producers and the livestock industry a leading force in the campaign?"

This organized effort against livestock diseases began in 1884 when Congress created a special agency within USDA to combat bovine pleuropneumonia—a dreaded cattle disease that was crippling exports as well as taking a heavy toll on domestic cattle. Within 8 years, contagious bovine pleuropneumonia had been eradicated and this campaign set the pattern for subsequent animal disease control and eradication programs.

To date, 13 serious livestock and poultry diseases have been eradicated from the United States. They are:

<i>Year</i>	<i>Disease</i>
1892	Contagious bovine pleuropneumonia
1929	Foot-and-mouth disease
1929	Fowl plague
1934	Glanders
1942	Dourine
1943	Texas cattle fever
1959	Vesicular exanthema (VE)
1959 & 66	Screwworms (southeast & southwest)
1971	Venezuelan equine encephalitis
1973	Sheep scabies
1974	Exotic Newcastle disease
1978	Classical swine fever
1985	Lethal avian influenza

Current VS disease eradication programs include cooperative State-Federal efforts directed at cattle and swine brucellosis, bovine tuberculosis, and pseudorabies in swine. The following table shows the status of States in these programs.

Disease control and eradication measures include quarantines to stop the movement of possibly infected or exposed animals, testing and examination to detect infection, destruction of infected (sometimes exposed) animals to prevent further disease spread, treatment to eliminate parasites, vaccination in some cases, and cleaning and disinfection of contaminated premises. In addition to the programs listed above, APHIS also cooperates with States in a voluntary Flock Certification program to combat scrapie in sheep and goats. By April 1998, 260 sheep and goat flocks had been enrolled in the certification program. A current listing of enrolled flock, by State and by breed, is available on the World Wide Web (<http://www.aphis.usda.gov/vs/scrapie/status.html>).

APHIS animal health programs are carried out by a field force of about 250 veterinarians and 360 lay inspectors working out of area offices (usually located in State capitals). Laboratory support for these programs is supplied by APHIS' National Veterinary Services Laboratories (NVSL) at Ames, IA, and Plum Island, NY, which are centers of excellence in the diagnostic sciences and an integral part of APHIS' animal health programs.

Under the Virus-Serum-Toxin Act of 1913, APHIS enforces regulations to assure that animal vaccines and other veterinary biologics are safe, pure, potent, and effective. Veterinary biologics are products designed to diagnose, prevent, or treat animal diseases. They are used to protect or diagnose disease in a variety of domestic animals, including farm animals, household pets, poultry, fish, and fur bearers.

Veterinarians and other professionals in the APHIS VS Center for Veterinary Biologics regulate and license veterinary biologics as well as the facilities where they are produced. They also inspect and monitor the production of veterinary biologics,

State	<i>Cattle</i> Brucellosis*	<i>Swine</i> Brucellosis**	<i>Cattle</i> TB***	<i>Swine</i> Pseudorabies****
AL	FREE	STAGE 2	FREE	FREE
AK	FREE	FREE	FREE	FREE
AZ	FREE	FREE	FREE	FREE
AR	FREE	STAGE 2	FREE	STAGE 3/4
CA	FREE	FREE	M-A	STAGE 3
CO	FREE	FREE	FREE	FREE
CT	FREE	FREE	FREE	FREE
DE	FREE	FREE	FREE	FREE
FL	FREE	STAGE 2	FREE	STAGE 3
GA	FREE	FREE	FREE	STAGE 4
HI	FREE	FREE	SUSP.M-A	STAGE 4
ID	FREE	FREE	FREE	FREE
IL	FREE	FREE	FREE	STAGE 3
IN	FREE	FREE	FREE	STAGE 2/3
IA	FREE	FREE	FREE	STAGE 2/3
KS	CLASS A	FREE	FREE	STAGE 3
KY	FREE	FREE	FREE	FREE
LA	FREE	STAGE 2	FREE	STAGE 3
ME	FREE	FREE	FREE	FREE
MD	FREE	FREE	FREE	FREE
MA	FREE	FREE	FREE	STAGE 4
MI	FREE	FREE	FREE	STAGE 3
MN	FREE	FREE	FREE	STAGE 2/3
MS	CLASS A	FREE	FREE	FREE
MO	CLASS A	FREE	FREE	STAGE 4
MT	FREE	FREE	FREE	FREE
NE	FREE	FREE	FREE	STAGE 3
NV	FREE	FREE	FREE	FREE
NH	FREE	FREE	FREE	FREE
NJ	FREE	FREE	FREE	STAGE 3
NM	FREE	FREE	M-A	FREE
NY	FREE	FREE	FREE	FREE
NC	FREE	FREE	FREE	STAGE 2/3
ND	FREE	FREE	FREE	FREE
OH	FREE	FREE	FREE	STAGE 3
OK	CLASS A	STAGE 2	FREE	STAGE 4
OR	FREE	FREE	FREE	FREE
PA	FREE	FREE	M-A	STAGE 3
PR	FREE	FREE	M-A	FREE
RI	FREE	FREE	FREE	FREE
SC	FREE	STAGE 2	FREE	FREE
SD	CLASS A	FREE	FREE	STAGE 3/4
TN	FREE	FREE	FREE	FREE
TX	CLASS A	STAGE 2	M-A	STAGE 3

UT	FREE	FREE	FREE	FREE
VT	FREE	FREE	FREE	FREE
VI	FREE	FREE	FREE	FREE
VA	FREE	FREE	FREE	FREE
WA	FREE	FREE	FREE	FREE
WV	FREE	FREE	FREE	FREE
WI	FREE	FREE	FREE	STAGE 3/4
WY	FREE	FREE	FREE	FREE

* Class A (less than 0.25 percent herd infection rate) or Class Free

** Stage 1,2, or Free

*** Modified Accredited (M-A) or Accredited Free (Free)

**** Stage 1,2,3,4, or Free

including both genetically engineered products and products produced by conventional means.

Since the first genetically engineered vaccine was licensed in 1979, a total of 79 such biologics have been licensed; all but 20 are still being produced. More than a half century ago, there were perhaps half a dozen animal vaccines and other biologics available to farmers. Now there are 2,379 active product licenses and 110 licensed manufacturers.

Monitoring Plant and Animal Pests and Diseases

In order to combat plant pests and animal diseases, it’s important to know their number and where they are located.

To monitor plant pests, APHIS PPQ works with the States in a project called the Cooperative Agricultural Pest Survey, which started in 1982 as a pilot project. Survey data on weeds, insects, and plant diseases and pests is entered into a nationwide database, the National Agricultural Pest Information System (NAPIS). This database can be accessed from anywhere in the country by persons with an authorized account.

By accessing NAPIS, users can retrieve the latest data on pests. NAPIS data can assist pest forecasting, early pest warning, quicker and more precise delimiting efforts, and better planning for plant pest eradication or control efforts. Survey data—which can reflect the absence as well as the presence of pests—also helps U.S. exports, assuring foreign countries that our commodities are free of specific pests and diseases.

There are more than a million records in the NAPIS database. Approximately 200 Federal and State agencies use NAPIS. NAPIS contains survey data files as well as text and graphics files. The data can be downloaded and analyzed with geographic information systems (GIS) to provide graphic representation of information. For example, locations of pine shoot beetle detections can be shown graphically as well as where and how often surveys have been conducted for the beetle. This information is used by the State and Federal agencies regulating this pest.

Describing animal health and management in the United States is the goal of the APHIS National Animal Health Monitoring System (NAHMS). This program, which is conducted by APHIS VS, began in 1983.

NAHMS compiles statistics and information from existing data bases and gathers new data through short- and long-term targeted studies to present a baseline picture of animal agriculture. This information then can be used to predict trends and improve animal production efficiency, and food quality. NAHMS provides statistically sound data concerning U.S. livestock and poultry diseases and disease conditions, along with their costs and associated production practices. By the end of 1997, NAHMS had conducted nine national studies on U.S. animal populations: swine (2), dairy (2), beef cow/calf (2), beef feedlot (1), sheep (1), and catfish (1). Sentinel monitoring of morbidity and mortality in beef feedlots is an ongoing monitoring project, as is bulk tank somatic cell count. Marek's disease in broiler operations, and poultry enteritis and mortality syndrome (PEMS) in turkeys were among NAHMS' short-term projects.

Information from NAHMS aids a broad group of users throughout agriculture. For instance, baseline animal health and management data from NAHMS national studies are helping analysts identify associations between *Salmonella* and cattle management. NAHMS data are also helping researchers evaluate management practices that contribute to the occurrence of Johne's disease and digital dermatitis in cattle. State and national officials, industry groups, and producers apply NAHMS data and information in educational programs and in setting research priorities.

NAHMS information is available through the World Wide Web (<http://www.aphis.usda.gov/vs/ceah>); see the Center for Animal Health Monitoring.

Regulating Biotechnology in Agriculture

Scientists use agricultural biotechnology with a variety of laboratory techniques, such as genetic engineering, to improve plants, animals, and microorganisms. Recent discoveries have led to virus-resistant crops such as cucumbers, tomatoes, and potatoes; to better vaccines and diagnostic kits used for diseases of horses, chickens, and swine; and even to new and improved varieties of commercial flowers.

Since 1987, APHIS' role in agricultural biotechnology has been to manage and oversee regulations to ensure the safe and rapid development of the products of biotechnology. Applicants under APHIS' effective regulations and practical guidelines can safely test—outside of the physical containment of the laboratory—genetically engineered organisms.

APHIS officials issue permits or acknowledge notification for the importation, interstate movement, or field testing of genetically engineered plants, microorganisms, and invertebrates that are developed from components from plant pathogenic material.

Since 1987, APHIS has issued more than 3,800 release permits and notifications at more than 17,000 sites in the United States and no environmental problems have resulted from these field tests. The biotechnology regulations also provide for an exemption process once it has been established that a genetically engineered product does not present a plant pest risk. Under this process, applicants can petition APHIS for a determination of nonregulated status for specific genetically engineered products. Over 2-1/2 years, 20 new engineered plant lines in 11 crops were proven safe and no longer need to be regulated by APHIS. One was the first genetically engineered sugar beet, which is herbicide tolerant.

The four recent deregulated include:

- tomato line with insect resistance,
- rapeseed (canola) line with herbicide tolerance,
- corn line with herbicide tolerance, and
- chicory (salad green) line with male sterility.

APHIS biotechnology personnel meet with regulatory officials from other nations on a regular basis to foster regulatory harmonization. These discussions are intended to help ensure that requirements imposed by other countries are as consistent as possible with U.S. requirements and that our trading partners are kept informed of biotechnology regulatory developments.

Controlling Wildlife Damage

The mission of APHIS' Wildlife Services (WS) program is to provide Federal leadership in managing problems caused by wildlife. Wildlife is a significant public resource that is greatly valued by the American public. But by its very nature, wildlife also can damage agricultural and industrial resources, pose risks to human health and safety, and affect other natural resources. WS helps solve problems that occur when human activity and wildlife are in conflict with one another. In doing so, WS attempts to develop and use wildlife management strategies that are biologically, environmentally, and socially sound.

The need for effective and environmentally sound wildlife damage management is rising dramatically. There are several reasons for this. Increasing suburban development intrudes upon traditional wildlife habitats. Population explosions of some adaptable wildlife species, such as coyotes, deer, and geese, pose increasing risks to human activities. At the same time, advances in science and technology are providing alternative methods for solving wildlife problems.

APHIS' National Wildlife Research Center (NWRC), the world's only research facility devoted entirely to the development of methods for managing wildlife damage, accounts for about one-fourth of WS' budget. In existence since the 1940's, NWRC has an integrated, multi-disciplinary research program that is uniquely suited to provide scientific information and solutions to wildlife damage problems.

A few examples of current NWRC projects include:

- developing chemosensory repellants and attractants for birds and mammals,
- finding methods to reduce threats to human safety when birds collide with airplanes,
- finding ways to control the brown tree snake in Guam,
- engineering an immunocontraceptive vaccine and delivery system to help resolve problems caused by wildlife overpopulation,
- reducing damage by birds to commercial fish production and cereal crops,
- studying coyote biology and behavior to develop techniques for protecting livestock from these predators,
- looking at ways to solve wildlife problems in urban areas involving such things as deer in backyards, squirrels damage to telephone lines, and geese on golf courses,
- reducing beaver damage to agricultural resources,
- developing methods to reduce wildlife damage to forest resources, and
- finding effective methods for reducing rodent damage to agricultural crops.

More than half of U.S. farmers experience economic loss from animal damage. In 1994, sheep and goat producers lost an estimated \$17.7 million due to predation. In 1995, cattle producers' losses to predators were worth \$39.6 million. During this year, coyotes alone caused \$11.5 million in sheep losses and \$21.8 million in cattle losses nationwide. A survey in 1993 showed that wildlife caused \$92 million in losses to corn producers in the top 10 corn-producing States.

Additionally, beavers in the Southeastern United States cause an estimated \$100 million in damage each year to public and private property, while Mississippi catfish farmers lose nearly \$6 million worth of fingerlings to fish-eating birds. During 1 year in Pennsylvania, white-tailed deer caused crop losses totaling \$30 million. Overall, bird populations cause an estimated annual loss to U.S. agriculture of \$100 million. In 1994, the annual dollar loss to agriculture in the United States from wildlife was between \$600 million and \$1.6 billion.

The National Agricultural Statistics Service surveyed 1,465 catfish producers in January of 1997. Results indicated that 68 percent of the respondents spent some effort to avoid wildlife-related losses to their catfish crops. Of all losses reported, 67 percent of the catfish were depredated by wildlife, primarily birds. In Mississippi, where 81 percent of wildlife damage was reported, cormorants were cited as the cause 53 percent of the time. Total cost of wildlife-related damage prevention of further damage was projected to have cost catfish producers \$17 million in 1996.

APHIS deals with a wide variety of wildlife problems, ranging from coyote predation on lambs to protecting endangered species from predation by other wildlife. Here are a few examples of WS efforts:

- A farmer in the State of Washington requested WS assistance after thousands of Canada geese congregated on his 43-acre field of carrots and began eating his crop, which had a potential market value of more than \$7,000 an acre. Noise-making devices and other scare tactics recommended by WS were successful in frightening the geese and keeping them out of his field.
- WS is conducting a program to reduce the impact of Canada geese on agricultural crops in southwestern Washington State. WS provides services to farmers using a variety of nonlethal methods to haze geese grazing on pastures and crops. These services are part of a cooperative effort involving the U.S. Fish and Wildlife Service (FWS), the Washington Department of Fish and Wildlife, and WS. The program has proven to be both effective and popular with farmers in the service area. During February, producers petitioned FWS, who is funding the program, to extend the period of service provided by WS. This resulted in FWS providing an additional \$200,000 to WS for field operations. These funds enabled WS to extend control activities into early May, when Canada goose damage to pastures and crops typically starts to decrease.
- A mountain lion that killed a dog and attacked another dog and a mule in Colorado was captured by a WS specialist and officials from the Colorado Division of Wildlife. The lion was released unharmed in a remote site about 165 miles from the community where the attacks occurred.

- On March 18, 1999, red-tailed hawks struck a 737 commercial airliner during a landing at the Eppley Air Field in Omaha, NE, causing an estimated \$300,000 worth of damage. WS is providing various types of technical advice and direct control assistance to reduce hazards at the airport. In a cooperative effort with airport officials, FWS, and WS—including NWRC—initiated a trapping program to capture red-tailed hawks and American kestrels and relocate them approximately 150 miles from the airport.
- WS' NWRC has entered into a new 5-year interagency agreement with the Federal Aviation Administration (FAA) to conduct research on understanding and reducing bird hazards to aircraft. This new agreement, covering 1999-2003, replaces an agreement that had been in place from 1991 to 1998. Research tasks to be conducted by NWRC for FAA under the new arrangement include: habitat management on and near airports to reduce bird activity, development and evaluation of bird repellent and frightening methods for airports, management and analysis of the National Wildlife Strike Database, and development of an FAA wildlife control manual for use by airport operators nationwide. The research will be coordinated out of NWRC's Ohio field station. Bird and other wildlife collisions with aircraft occasionally result in the loss of life and cost U.S. aviation over \$300 million per year.
- Livestock guarding dogs, predator-proof fencing, and the "Electronic Guard" (a device developed by WS that combines a flashing strobe light and a siren to scare coyotes) are examples of nonlethal ways to minimize damage from predators.
- WS helps protect many threatened or endangered species from predation, including the California least tern and light-footed clapper rail, the San Clemente Island loggerhead strike, Louisiana black bear, the Aleutian Canada goose, the black-footed ferret, the Louisiana pearl shell (mussel), and two species of endangered sea turtles.
- Since 1995, WS has cooperated with Texas officials in a multi-year program to help combat rabies epidemics in southern and central parts of the State. WS cooperated in the development of coyote bait units containing a genetically engineered rabies vaccine approved by APHIS for use in the project. Cumulatively, since 1995, more than 11 million bait units have been dropped over an area of 171,000 square miles in Texas. The goal of the project is to create a buffer zone of immunized coyotes to help prevent the further spread of canine rabies across Texas into more heavily populated areas. January 1999 marked the fifth year that WS has participated in the project to prevent the spread of canine rabies in both coyotes and foxes. The 1999 operation of the project was concluded in 26 days and involved the distribution of approximately 2.7 million bait units of an area of nearly 34,000 square miles in south and central Texas. The project has led to a marked decrease in the incidence of rabies in wild canids.

Humane Care of Animals

APHIS administers two laws that seek to ensure the humane handling of animals: the Animal Welfare Act (AWA) and the Horse Protection Act (HPA).

For more than a quarter century, USDA has enforced the AWA and its standards and regulations to prevent the trafficking in lost and stolen pets and protect animals from inhumane treatment and neglect. Congress passed the AWA in 1966 and strengthened the law through amendments in 1970, 1976, 1985, and 1990.

The AWA prohibits staged dogfights, bear and raccoon baiting, and similar animal fighting ventures. It also requires that minimum standards of care and treatment be provided for most warmblooded animals bred for commercial sale, used in research, transported commercially, or exhibited to the public. This includes animals exhibited in zoos, circuses, and marine mammal facilities as well as pets transported on commercial airlines.

Individuals who operate regulated businesses must be licensed or registered with USDA and provide their animals with adequate care and treatment in the areas of housing, handling, sanitation, nutrition, water, veterinary care, and protection from extremes of weather and temperature. They must also keep accurate acquisition and disposition records and a description of every animal that comes into their possession. In addition:

- Dealers must hold the animals they acquire for a period of 5 to 10 days to verify the animals' origin and allow pet owners an opportunity to locate a missing pet.
- Research facilities must provide dogs with the opportunity for exercise; promote the psychological well-being of primates used in laboratories; and give all regulated animals anesthesia or pain-relieving medication to minimize any pain or distress caused by research if the experiment allows.
- Research facilities must establish an institutional animal care and use committee to oversee the use of animals in experiments. This committee reviews research protocols and facilities to ensure they are in compliance with the AWA. It also ensures that researchers explore alternatives to painful experiments and ways to reduce the numbers of animals used. The committee must be composed of at least three members, including one veterinarian and one person who is not affiliated with the facility in any way.

In enforcing the AWA, APHIS conducts preclicensing inspections of licensees. Before issuing a license, applicants must be in compliance with all standards and regulations under the AWA.

APHIS also conducts randomly scheduled unannounced inspections to ensure that all regulated facilities continue to comply with the Act. If an inspection reveals deficiencies in meeting the AWA standards and regulations, the inspector instructs the licensee or registrant to correct the problems within a given timeframe. If deficiencies remain uncorrected at the followup inspection, APHIS documents the facility's deficiencies and considers possible legal action. Such action could include fines and/or license suspensions or revocations.

In FY 1998, APHIS pursued numerous cases against individuals who were not in compliance with the AWA. The tables below provide data on APHIS' inspection and enforcement efforts for FY 1996-98.

Compliance Inspections, FY 1996–98

<i>FY</i>	<i>Total facilities (sites)</i>	<i>Total compliance inspections</i>
1998	7,773 (10,393)	10,709
1997	7,789 (10,534)	12,056
1996	7,837 (10,366)	12,635

Sanctions Imposed, FY 1996–98

<i>FY</i>	<i>Fines Imposed</i>	<i>Revocations, suspensions, and disqualifications</i>
1998	\$378,900	34
1997	\$868,440	43
1996	\$1,052,225	29

USDA also enforces the HPA, which Congress enacted in 1970 (and amended in 1976), to end the practice of “soring” the limbs of Tennessee walking horses and other gaited breeds. The HPA prohibits persons from transporting sore horses to show, sales, and auctions, and from entering and exhibiting sore horses in such events.

Soring practices occur primarily by two means: mechanical and chemical. Regardless of the method, soring is a deliberate attempt to alter the gait of a horse by creating a superficial irritation or lesion that is aggravated by training or performing. Soring practices are primarily confined to the pasterns of the horse’s feet.

The management of horse shows, sales, and actions is authorized to employ individuals, called Designated Qualified Persons or DQP’s, to examine horses for compliance with the HPA and the horse protection regulations. DQP’s are required to disqualify from exhibition any horse that is sore or otherwise not in compliance with the regulations (which, among other things, prohibit the use of certain devices and substances on horses’ feet). Even if show management has hired a licensed DQP, it is a violation of the HPA to allow a sore horse to be exhibited if that DQP, or the USDA, has informed management that the horse is sore.

USDA veterinarians also attend shows, sales, and actions in order to ensure that sore horses are not exhibited and to evaluate the performance of the DQP’s at these events. USDA veterinarians will also examine horses for compliance with the act, if the DQP did not perform a complete examination or if they suspect that a horse is sore.

The HPA provides for both civil and criminal sanctions for violations. The Secretary is authorized to impose a civil penalty of up to \$2,000 for each violation of the HPA, after notice and an opportunity for a hearing, and may disqualify the violator from participating in shows, sales, and auctions for not less than 1 year for the first violation and not less than 5 years for any subsequent violation. Criminal violations are punishable by a fine of up to \$3,000 for the first conviction, and up to \$5,000 for any subsequent conviction, as well as imprisonment for up to 1 year for a first conviction, and up to 2 years for a subsequent conviction.

Aquaculture

APHIS provides services to the aquaculture industry in a number of areas. Aquaculture is the fastest growing segment of U.S. agriculture, surpassing in value most domestic fruit, vegetable, and nut crops. Between 1980 and 1990, the industry experienced a 400-percent increase in growth; it is now estimated to be worth approximately \$1.5 billion. The aquaculture industry provides about 300,000 jobs nationwide.

Current APHIS services include licensing of fish vaccines and other biologics under the Virus-Serum-Toxin Act; controlling birds and damage-causing animals; and providing health certification services for exports. We are currently working to expand our aquatic animal health activities and underlying authority to support industry efforts to increase exports of aquacultural products around the world, for coordinating interstate regulation, and for protection from the entry of animal pests and diseases. Examples include:

- European Union (EU) animal health negotiators have been extremely concerned that U.S. aquatic health regulations are not equivalent to those of the EU, with the main concern centering around the fact that the United States does not have a single Federal agency with legal authority to monitor, prevent, and control outbreaks of aquatic animal disease. Currently, U.S. responsibility in this area is divided among four Federal departments (Agriculture, Interior, Commerce, and Health and Human Services) and the 50 States. APHIS is working with the Joint Subcommittee on Aquaculture's Task Force on Aquatic Animal Health to clarify Federal agency roles, avoid duplication of authority, and achieve adequate protection of U.S. aquatic animals, both wild and cultivated.
- APHIS has produced a video about health certification procedures for the export of aquacultural products. The goal of the video—which uses the example of exporting trout eggs from Washington State to Chile—is to provide animal health and natural resources officials and aquacultural producers with a model of how to implement an aquatic health protocol for exportation of products to a foreign country.
- APHIS' WS program hired three wildlife biologists last July, placing them in Florida, Alabama, and Mississippi to assist aquaculture producers with bird depredation problems. These biologists are helping develop new methods for controlling fish-eating birds, providing onsite assistance to aquaculture producers experiencing depredation problems, and developing management plans for fish-eating bird species in the three States.
- APHIS' VS Centers for Epidemiology and Animal Health (CEAH) completed an overview of the U.S. aquaculture industry, including an analysis of focus on trends in farm size, geographic distribution of aquatic species, and a description of the industry's diversity. During 1997, CEAH worked with USDA's National Agricultural Statistics Service on a comprehensive national study of the U.S. catfish industry.

Recent outbreaks of Taura Syndrome Virus in Texas and Hawaii have caused millions of dollars in losses to shrimp producers in those States. This disease is thought to have been introduced via shrimp products imported from South America.

APHIS officials have not provided any assistance to the producers affected by this outbreak, nor have they assisted in efforts to control and prevent spread of the disease. To rectify this situation, APHIS published an Advance Notice of Proposed Rulemaking seeking comments on treating farm-raised finfish as livestock under the animal quarantine laws. This could lead to a coordinated Federal regulatory program to prevent the introduction and spread of aquatic plants, animals, and organisms that could harm commercial aquaculture production.

■ Grain Inspection, Packers and Stockyards Administration

The Grain Inspection, Packers and Stockyards Administration (GIPSA) facilitates the marketing of livestock, poultry, meat, grain, oilseeds, and related agricultural products and promotes fair and competitive trading practices for the overall benefit of consumers and American agriculture.

GIPSA, like its sister agencies in USDA's Marketing and Regulatory Programs, is working to ensure a productive and competitive global marketplace for U.S. agricultural products. The agency's Federal Grain Inspection Service (FGIS) provides the U.S. grain market with Federal quality standards and a uniform system for applying them. GIPSA's Packers and Stockyards Programs ensure open and competitive markets for livestock, meat, and poultry.

Federal Grain Inspection Program

Through its Federal Grain Inspection Program, GIPSA facilitates the marketing of grain, oilseeds, pulses, rice, and related commodities. This program serves American agriculture by providing descriptions (grades) and testing methodologies for measuring the quality and quantity of grain, rice, edible beans, and related commodities. GIPSA also provides a wide range of inspection and weighing services, on a fee basis, through the official grain inspection and weighing system, a unique partnership of Federal, State, and private laboratories. In FY 1997, the official system performed over 2 million inspections on 226 million metric tons of grain and related commodities.

Specifically, under the U.S. Grain Standards Act, and those provisions of the Agricultural Marketing Act of 1946 (AMA) that relate to inspection of rice, pulses, lentils, and processed grain products, the Federal Grain Inspection Program:

- Establishes official U.S. grading standards and testing procedures for eight grains (barley, corn, oats, rye, sorghum, triticale, wheat, and mixed grain), for oilseeds (canola, flaxseed, soybeans, and sunflower seed), rice, lentils, dry peas, and a variety of edible beans.
- Provides American agriculture and customers of U.S. grain around the world with a national inspection and weighing system that applies the official grading and testing standards and procedures in a uniform, accurate, and impartial manner.

- Inspects and weighs exported grain and oilseeds. Domestic and imported grain and oilseed shipments, and crops with standards under the AMA, are inspected and weighed upon request.
- Monitors grain handling practices to prevent the deceptive use of the grading standards and official inspection and weighing results, and the degradation of grain quality through the introduction of foreign material, dockage, or other nongrain material to grain.

By serving as an impartial third party, and by ensuring that the Official U.S. Standards for Grain are applied properly and that weights are recorded fairly and accurately, GIPSA and the official grain inspection and weighing system advance the orderly and efficient marketing and effective distribution of U.S. grain and other assigned commodities from the Nation's farms to destinations around the world.

Packers and Stockyards Programs

GIPSA's Packers and Stockyards Programs administers the Packers and Stockyards (P&S) Act of 1921. The purpose of the P&S Act, which has been amended to keep pace with changes in the industry, is to assure fair competition and fair trade practice, safeguard farmers and ranchers, and protect consumers and members of the livestock, meat, and poultry industries from unfair business practices that can unduly affect meat and poultry distribution and prices. Enforcement of the P&S Act takes place through the maintenance of administrative disciplinary proceedings within USDA and the filing of actions in court. The P&S Act also provides for members of the industry to file complaints with USDA, seeking reparation.

Payment Protection

The P&S Act requires prompt payment for livestock purchased by dealers, market agencies, and packers whose operations are subject to the Act. Pursuant to this requirement, subject firms must pay for livestock before the close of the next business day following the purchase and transfer of possession. In addition, the Act establishes specific payment deliver requirements for livestock purchased for slaughter. Also, packers, market agencies, and dealers operating in commerce are required to file a surety bond or its equivalent. At the beginning of FY 1998, bonds totaling \$631 million were in place to cover the livestock purchases of packers, market agencies, and dealers.

GIPSA also emphasizes custodial account investigations as a means of payment protection for consignors of livestock. All market agencies selling on a commission basis are required to establish and maintain a separate bank account designated as "Custodial Account for Shippers' Proceeds," to be used for deposits from livestock purchasers and disbursements to consignors of livestock. The custodial audit program has been very successful in protecting funds due livestock sellers.

Packer and Poultry Trust Activities

The P&S Act provides that if a meat packer fails to pay for livestock in a cash sale, or a live poultry dealer fails to pay for live poultry grown under a poultry growing arrangement, then receivables, inventories, and proceeds held by the packer or

poultry dealer become trust assets. These assets are held by the meat packer or live poultry dealer for the benefit of all unpaid cash sellers and/or poultry growers. Cash sellers of livestock and poultry growers receive priority payment in bankruptcy or in claims against trust assets in the event of business failure.

Fair Competition

GIPSA works to eliminate unfair, unjustly discriminatory, or deceptive practices in the meat and poultry industries, with special emphasis on investigation of anticompetitive activities. Practices such as apportioning of territories, price manipulation, arrangements not to compete, and payoffs or kickbacks to buyers are violations of the P&S Act. GIPSA staff members immediately investigate any practice that indicates a possible unfair or discriminatory practice.

Scales and Weighing Activities

GIPSA is concerned with two different elements that affect the integrity of weights: (1) the accuracy of scales used for weighing livestock, meat, and poultry, and (2) the proper and honest operation of scales to assure that the weight on which a transaction is based is accurate.

The major emphasis is on detecting improper and fraudulent use of scales. GIPSA's investigative program uses several different procedures to determine whether weighing activity is proper and honest. Agency investigators routinely visit livestock auction markets, buying stations, and packing plants to verify that livestock, carcasses, and live poultry have been accurately weighed and to examine weight records and equipment.

Trade Practices

Fraudulent trade practices—such as price manipulation, weight manipulation of livestock or carcasses, improper use or designation of carcass grades, misrepresentation of livestock as to origin and health, and other unfair and deceptive practices—continue to be concerns within the industry. GIPSA investigates these practices when complaints are received or when such practices are uncovered during other investigations.

Fair Treatment for Poultry Growers

GIPSA enforces the trade practice provisions of the P&S Act relating to live poultry dealers. Its investigative program extensively examines the records of poultry integrators to determine the existence of any unfair, unjustly discriminatory, or deceptive practices in its dealings with poultry growers and sellers. Complaints alleging unfair termination of growing contracts are investigated on a priority basis.

Carcass Merit Purchasing

GIPSA monitors the use of electronic evaluation devices by hog slaughterers who purchase hogs on a carcass merit basis, to ensure that the electronic measuring is accurate and properly applied and that the producer receives an accurate accounting of the sale.

Analysis of Structural Change

GIPSA examines structural changes in the livestock, meat packing, and poultry industries and analyzes the competitive implications of these structural changes. GIPSA uses the analyses as tools in enforcing the P&S Act and in addressing public policy issues relating to the livestock, meat packing, and poultry industries.

Clear Title

The Clear Title provisions of the Food Security Act of 1985 permit States to establish central filing systems to inform parties about liens on farm products. The purpose of this program is to remove an obstruction to interstate commerce in farm products. GIPSA certifies when a State's central filing system complies with the Act.

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